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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/580,026	05/26/2000	Stephen M. Dershem	QUANT1190-2	9980

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EXAMINER

MCCLENDON, SANZA L

ART UNIT	PAPER NUMBER
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1711

DATE MAILED: 06/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/580,026	Applicant(s) DERSHEM ET AL. 9-20	
	Examiner Sanza L McClendon	Art Unit 1711	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27, 29, 30, 32, 33, 36-44 and 46 is/are pending in the application.
- 4a) Of the above claim(s) 9-23, 25, 26, 29, 32, 35, 37, 38, 40, 41, 43 and 44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 24, 27, 30, 33, 36, 39, 42 and 46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>18/16</u> | 6) <input type="checkbox"/> Other: |

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DETAILED ACTION

Election/Restrictions

1. Claims 9-23, 25-26, 29, 32, 35, 37-38, 40-41, and 43-44 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions outlined in Groups II-IV, there being no allowable generic or linking claim. Election was made without traverse in Paper No. 19. With respect to claims 29, 32, 35, 38, 41, and 44 the examiner agrees these claims should be grouped in Group II. Therefore the restriction requirement groups are as follows:

I. Claims 1-8, 24, 27, 30, 33, 36, 39, 42, and 46

II. Claims 9-18 and 25

III. Claims 19-23, 26, 29, 32, 35, 38, 41, and 44

IV. Claims 37, 40, and 43, wherein Groups II-IV are withdrawn as requested in paper number 19.

Response to Amendment

2. In response to the Amendment received on April 14, 2003, the examiner has carefully considered the amendments. The examiner acknowledges the amendment of claim 46.

Claim Objections

3. Claims 1-2 and 6-8 are objected to because of the following informalities: applicant(s) have employed or used improper Markush language, i.e., selected from, in defining the Markush groupings of X in claims 1-2 diluents in 6, initiators in 7, and coupling agents in 8; The proper Markush language should read "selected from the group consisting of". See M.P.E.P. 2173.05(h). Appropriate correction is required.

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4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3 and 7-8 are rejected under 35 U.S.C. 102(b) as being anticipated by DeKoning (4,766,179).

DeKoning teaches bismaleimide compositions. Said compositions comprises 64-4 parts by weight of a bismaleimide having the formula found in column 2, line 5, from 7-77 parts by weight of one or more ethylenically unsaturated compounds, from 3 to 60 parts by weight of one or more compounds selected from hydroxyalkyl acrylates and amino-alkylacrylates, and 1-20 parts by weight of one or more terminally functional polymers as a flexibilizers. The bismaleimide as taught by DeKoning appears to anticipate applicant's bismaleimide because Z can be a substituted alkylene having 2-25 carbon atoms. It is deemed to be anticipated because applicant's has not positively recited in claim 1 that the mono-valent or polyvalent radicals can/cannot be substituted with moieties such as nitrogens, hydroxyls, or halogens and the like. DeKoning teaches that bismaleimide compositions can be soluble in simple solvents or the composition can be a solution in the ethylenically unsaturated copolymerizable monomer—see column 4, lines 5-7 and 8-13. This appears to anticipate the diluent in claim 2 and the coupling agent in claims 8, wherein up to 10 parts by weight of said ethylenically unsaturated compound anticipates claim 3. In addition to the above-defined components the composition can comprise a source of free radicals for curing said composition, wherein these comprise peroxides—see column 5, lines 14-19. Per example II, DeKoning teaches adding at least 1 wt% of the free radical initiator. These appear to anticipate the radical source in claim 2 and the initiator of claim 7.

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6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeKoning (4,766,179).

DeKoning does not expressly teach the viscosities of the bismaleimide compositions, however DeKoning per examples teaches that said composition is poured into a mold and then cured. In addition, DeKoning teaches that said bismaleimide compositions are soluble in certain solvents and the ethylenically unsaturated compounds useable in said composition. These teaching combined with the fact that applicant has not established the criticality of the viscosity ranges in claims 4-5, it is deemed that an ordinarily skilled artisan could have tailored the composition to a viscosity which allows for pouring, spraying, or other methods of producing a final product in the absence of unexpected results or convincing arguments to the contrary.

8. Claims 1-3, 7-8, 24, 27, 30, 33, 36, and 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ketley (4,740,830) in view of DeKoning (4,766,179).

Ketley teaches low temperature single step curing polyimide adhesives for electronic devices, such as semi-conductors. Said adhesives comprises 15-50% of a bismaleimide resin having the formula found in column 1, line 55, wherein R is an aromatic group; 15 to 30 wt% of a solvent; and 50-85 wt% of silver powder. Wherein silver is electrically conductive, as well as, thermally conductive. Ketley teaches said silver-paste adhesive can be used for bonding electronic devices, such as semiconductors, to substrates. Said method of bonding comprises applying said paste onto a substrate, setting said electronic device onto the paste coated substrate, applying pressure to form an assembly, and then curing said assembly—see column 4, lines 30-35. Ketley does not expressly teach a bismaleimide resin having aliphatic

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linking groups or an aromatic group as defined by applicant's claim 1, adding a curing agent, nor adding a coupling agent.

DeKoning teaches bismaleimide compositions comprising a bismaleimide having the formula found in column 2, line 5, from 7-77 parts by weight of one or more ethylenically unsaturated compounds, one or more compounds selected from hydroxyalkyl acrylates and amino-alkylacrylates, one or more terminally functional polymers as a flexibilizers, and curing agents. Said bismaleimides taught by DeKoning read on at least two of the aromatic groups the same as those taught by Ketley, that is when Z is -O- or -CH₂-. In addition DeKoning teaches bismaleimides comprising aliphatic linking groups, such as substituted alkylene groups—see column 2, lines 5-65. Because DeKoning teaches both kinds of bismaleimides, they [bismaleimides] are deemed to be equivalent.

Ketley and DeKoning are analogous art because they are from the same field of endeavor that is from the bismaleimide composition art. Therefore it would have been obvious for a skilled artisan to use a bismaleimide comprising an alkylene linking group such as those taught by DeKoning in the composition as taught by Ketley because the bismaleimides taught by both DeKoning and Ketley (those with aromatic linking groups) are deemed to be equivalent to those having alkylene linking groups. The motivation would have been the expectation of a bismaleimide resin adhesive composition having low temperature single-step cure as taught by Ketley in the absence of unexpected results and/or evidence to the contrary. In addition, it would have been obvious for a skilled artisan to use a peroxide coupling agent as taught by DeKoning in the bismaleimide resin adhesive compositions of Ketley. The motivation would have been the expectation of an adequate and faster cure in the absence of unexpected results and/or convincing arguments to the contrary. Finally, it would have been obvious for a skilled artisan to use a coupling agent, such as the ethylenically unsaturated compounds as taught by DeKoning. Wherein the motivation would have been the expectation of adequately aiding processing steps, such as mixing the composition because the components of the composition, such as the bismaleimide are soluble in the ethylenically unsaturated compound, in addition, to the expectation of strengthening the resulting adhesive by adding crosslinking points in the final matrix.

Allowable Subject Matter

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9. Claim 46 is allowed over the prior art and interference will be taken up in due course.

10. The following is a statement of reasons for the indication of allowable subject matter: The prior art made of record fails to teach a curable composition that comprises a maleimide compound and a curing initiator with the limitations of the instant claims.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sanza L McClendon whose telephone number is (703) 305-0505. The examiner can normally be reached on Monday through Friday 8:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (703) 308-2462. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0657.


Sanza L McClendon

Examiner

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SMc

June 23, 2003


James J. Seidleck
Supervisory Patent Examiner
Technology Center 1700